

What is claimed is:

- 1 1. A method for coating an implant comprising the  
2 steps of  
3 (a) contacting the implant with an aqueous  
4 solution of magnesium, calcium, and phosphate ions;  
5 (b) passing a gaseous weak acid through the  
6 aqueous solution;  
7 (c) degassing the aqueous solution; and  
8 (d) allowing the magnesium, calcium, and  
9 phosphate ions to precipitate onto the implant to form a  
10 coating.
- 1 2. The method of claim 1 wherein the gaseous weak  
2 acid is carbon dioxide.
- 1 3. The method of claim 1 wherein the implant is  
2 formed from one or more of metal, organic material, polymer  
3 or ceramic.
- 1 4. The method according to claim 1 wherein the  
2 calcium and phosphate ions are present in the aqueous  
3 solution in a molar ratio of between about 1 to about 3.
- 1 5. The method according to claim 1 wherein the  
2 calcium and phosphate ions are present in the aqueous  
3 solution in a molar ratio of between about 1.5 to about  
4 2.5.
- 1 6. The method according to claim 1 wherein the  
2 aqueous solution comprises about 0.5 to about 50 mM calcium  
3 ions and about 0.5 to about 20 mM phosphate ions.
- 4 7. The method according to claim 1 wherein the  
5 aqueous solution comprises about 2.5 to about 25 mM calcium  
6 ions and about 1.0 to about 10 mM phosphate ions.

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1 17. The method according to claim 1 wherein the  
2 aqueous solution has a temperature in the range of between  
3 about 5°C to about 50°C.

1 18. The method according to claim 1 wherein the  
2 implant is treated by a mechanical or chemical surface  
3 treatment prior to contacting the implant with the aqueous  
4 solution.

1 19. The method of claim 18 wherein the implant is  
2 treated by sand-blasting, scoring, polishing or grounding.

1 20. The method of claim 18 wherein the implant is  
2 treated by contacting with strong mineral acid or an  
3 oxidizing agent in a manner to etch the implant.

1 21. The method of claim 1 wherein the coating  
2 comprises magnesium ions, calcium ions and phosphate ions  
3 and one or more ions selected from the group consisting of  
4 hydroxide, carbonate, chloride, sodium and potassium.

1 22. The method of claim 1 wherein the coating  
2 comprises one or more of amorphous carbonate calcium  
3 phosphate, hydroxyapatite, calcium deficient and hydroxyl  
4 carbonate apatite, octacalcium phosphate, dicalcium  
5 phosphate dihydrate or calcium carbonate.

1 23. The method of claim 1 wherein the coating has a  
2 thickness of about 0.5 to about 100 microns.

1 24. The method of claim 1 wherein the coating has a  
2 thickness of about 0.5 to about 50 microns.

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1        ~~25. The method of claim 1 further comprising the step~~  
2        ~~of contacting a coated implant with a calcifying solution~~  
3        ~~comprising calcium and phosphate ions, and allowing a~~  
4        ~~precipitate layer of calcium and phosphate ions to form on~~  
5        ~~the coated implant.~~

1                26. A device for coating an implant comprising  
2                (a) reactor vessel;  
3                (b) heating element operatively connected to the  
4        reactor vessel;  
5                (c) implant support;  
6                (d) stirrer disposed within the reactor vessel;  
7                (f) inlet and outlet operatively connected to  
8        the reactor vessel; and  
9                (g) controlled source of carbon dioxide  
10        operatively connected to the inlet.

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